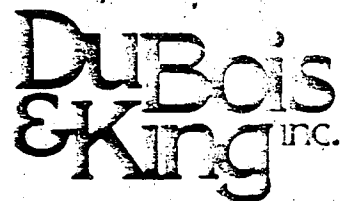


8-22-84



ENGINEERING • PLANNING • DEVELOPMENT • MANAGEMENT

82821

August 22, 1984

Box 339

Randolph, Vermont 05060-0339

(802) 728-3376

Telex No. 469141



SEMS DocID

623559

Mr. Richard O'Brien, Director
Environmental Affairs and Safety
Aerojet General
10300 North Torrey Pines Road
La Jolla, California 92037

SUBJECT: July 1984 Groundwater Monitoring Results
from the Rutland, Vermont Facility

Dear Dick:

As we discussed in our recent phone conversation, we have finally received the results of the GC/MS volatile organics scan of the water taken from three of the groundwater monitoring wells at the Rutland, Vermont facility. The monitoring results are presented on the attached tables and indicate that significant amounts of organic compounds are still present and that there may be a net migration in a downgradient direction towards Moon Brook. The static water levels, conductivity and pH are comparable to what was found in August, 1983. However, as we have discussed, I feel that it would be appropriate to have a more detailed hydrogeologic investigation done. Please feel free to contact either me or Terry Lorber with any questions or comments you may have. I look forward to hearing from you and continuing to assist with the groundwater monitoring.

Very truly yours,

DuBois & King, Inc.

A handwritten signature in dark ink, appearing to read 'John F. Amadon', written over a horizontal line.

John F. Amadon
Laboratory Director

JFA/pal
Enclosures

July, 1984

Groundwater Monitoring Program at the
Former Howe-Richardson Facility in
Rutland, Vermont

Well #	Depth (ft) from TOC*		Specific Conductance (umhos/cm)	pH Su
	to bottom of water column	to static water level		
1	19.33	9.33	380	7.45
2	20.83	12.42	305	7.7
3	18.83	14.08	425	7.2
4	29.08	13.50	1320	8.15
5	4.75	9.75	280	7.3
7	30.42	16.75	625	7.75
8	30.25	18.67	1250	7.9
9	8.08	7.58	92	7.25
10	6.33	6.00	1315	7.70
11	5.71	5.33	315	7.15
12	5.67	5.29	65	7.10

* TOC denotes top of casing

July, 1984

Groundwater Monitoring Program at the
Former Howe-Richardson Facility in
Rutland, Vermont

Volatile Compounds	Detection Limit (ug/L)	MW-4 (ug/L)	MW-7 (ug/L)	MW-8 (ug/L)
Acrolein	100			
Acrylonitrile	100			
Benzene	10			
Bis (Chloromethyl) Ether	10			
Bromodichloromethane	10	70		
Bromoform	10			
Bromomethane	10			
Carbon Tetrachloride	10	85	115	
Chlorobenzene	10			
Chloroethane	10			
2-Chloroethyl Vinyl Ether	10			
Chloroform	10			
Chloromethane	10			
Dibromochloromethane	10			
Dichlorodifluoromethane	10			
1,1-Dichloroethane	10	20		28
1,2-Dichloroethane	10			
1,1-Dichloroethylene	10	1,950	200	620
trans-1,2-Dichloroethylene	10			
1,2-Dichloropropane	10			
1,3-Dichloropropene	10			
Ethylbenzene	10			
Methylene Chloride	10			
1,1,2,2-Tetrachloroethane	10			
1,1,2,2-Tetrachloroethene	10			
Toluene	10			
1,1,1-Trichloroethane	10	14		18
1,1,2-Trichloroethane	10			
Trichloroethylene	10	12		
Trichlorofluoromethane	10			
Vinyl Chloride	10			
Acetone	10	125		30

Blank indicates analysis performed but compound not detected above detection limit.

RECEIVED

OCT 2 1984

ENVIRONMENTAL AFFAIRS
& SAFETY

Box 339

Randolph, Vermont 05060-0339

(802) 728-3376

Telex No. 469141

ENGINEERING • PLANNING • DEVELOPMENT • MANAGEMENT

82821

September 26, 1984

Mr. Richard O'Brien, Director
Environmental Affairs and Safety
Aerojet General
10300 North Torrey Pines Road
La Jolla, California 92037

SUBJECT: September 1984 Groundwater Monitoring Results
from the Rutland, Vermont Facility

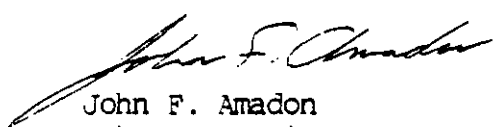
Dear Dick:

DuBois & King, Inc. is pleased to present you with the enclosed report concerning the recent groundwater monitoring at the Rutland, Vermont facility. I was pleased to have the opportunity to meet with you and your staff earlier this month to demonstrate our purging/sampling techniques as well as learn some of your techniques.

I trust that the enclosed report is self explanatory and that you will call me with any questions or comments you may have. I look forward to reviewing the results that your staff is generating, as well as to continue to assist you further in defining the extent of any contamination.

Very truly yours,

DuBois & King, Inc.


John F. Amadon
Laboratory Director

JFA/pal
Enclosure

September, 1984 Groundwater Monitoring at the Former
Howe-Richardson Scale Company Facility
in Rutland, Vermont

On September 11, 1984 a groundwater monitoring round was initiated as a follow up to previous monitoring which began at the facility in the spring of 1980. The purpose of this current round was twofold: 1) to continue with the existing monitoring program performed by DuBois & King, Inc., and 2) to allow representatives of Aerojet General to observe the techniques that have been utilized to date as well as to obtain groundwater samples by their techniques for analysis of volatile organics in their laboratories.

On September 11, 1984 the test wells identified in Figure 1 were purged in the following order; TW2, TW1, TW3, TW5, TW7, TW8, and TW4. This order was established, based on historical data, to work from the lowest expected concentrations to the highest. Prior to purging each well, the static water level was measured from the top of the well casings using a tape measure. Purging of the wells was performed by peristaltic pumping. The outside of the braided tygon tubing was wiped dry as the tubing was removed from each well. Prior to immersion in the next well, approximately 1/2 gallon of distilled water was pumped through the tubing. For the two pumps utilized in purging, one set of tubing was 50' long with a 3/8" ID. The second set of tubing was 30' long with a 1/4" ID. The tubing was inserted to the bottom of the well where sediment had collected. The tubing was then pulled up off the 'bottom' 2 to 3 inches and pumping continued until the waters were removed to that depth or, in the case of TW2 on September 12, 1984, over three well volumes were removed. Samples for onsite measurement of conductivity and pH were taken from the peristaltic tubing near the end of the purging time for each well.

Later that afternoon, September 11, 1984, static levels were measured and samples were obtained. A 3/4" ID PVC bailer was used for sampling for volatile organics. One bail was required for each of the duplicate glass and teflon capped vials for each well. Between monitoring wells, the bailer was immersed in a portable "dummy well" containing distilled water. This was done twice between monitoring wells. Due to the slow recovery of test well 5, no samples were obtained on September 11.

All volatile organics samples were kept chilled and in the dark. On September 13, 1984 the samples were shipped on ice, via Federal Express to Eastern Analytical, Inc., in Concord, New Hampshire. Analysis of the volatile organics was done by purge and trap gas chromatography with flame ionization detection. Copies of Eastern Analyticals results and the chain of custody reports are enclosed.

On September 12, 1984 static water levels were again recorded using both the tape measure and an electronic sounder of Aerojet's. The wells were purged in a manner akin to the September 11 purging. Samples of the final distilled water flushing the tubing were obtained by the Aerojet staff to assist in ascertaining whether any well to well carry over or contamination was occurring. In addition, on September 12, the Aerojet staff obtained

volatile organics samples with their teflon bailer from each well following sufficient recovery. Additional samples were taken with the teflon bailer for on-site pH and conductivity measurements. Test well 5 was sampled on September 12 without a prepurge for both DuBois & King, Inc. and Aerojet analyses. An additional split sample was obtained from Test Well 4 as well as the downstream Moon Brook sampling station.

The current DuBois & King, Inc. results are presented in Tables 1 and 2. These results appear comparable with recent historic data with respect to differences in static water levels between the wells, their degree of sediment buildup, and water quality parameters with respect to pH and specific conductance. The volatile organics assay again indicates that TW4 is the 'hot spot' but unlike the July, 1984 assay, TW7 had overall higher concentrations than TW8. It should also be noted that the two assays for TW4 were comparable despite the presence of small gas bubbles that developed in the September 11 sample, and the difference in sampling techniques over the two days.

Further analysis and interpretation of this current data and the historical data will be performed in the next phase of the groundwater monitoring program when all the current results will be available.

FIGURE 1

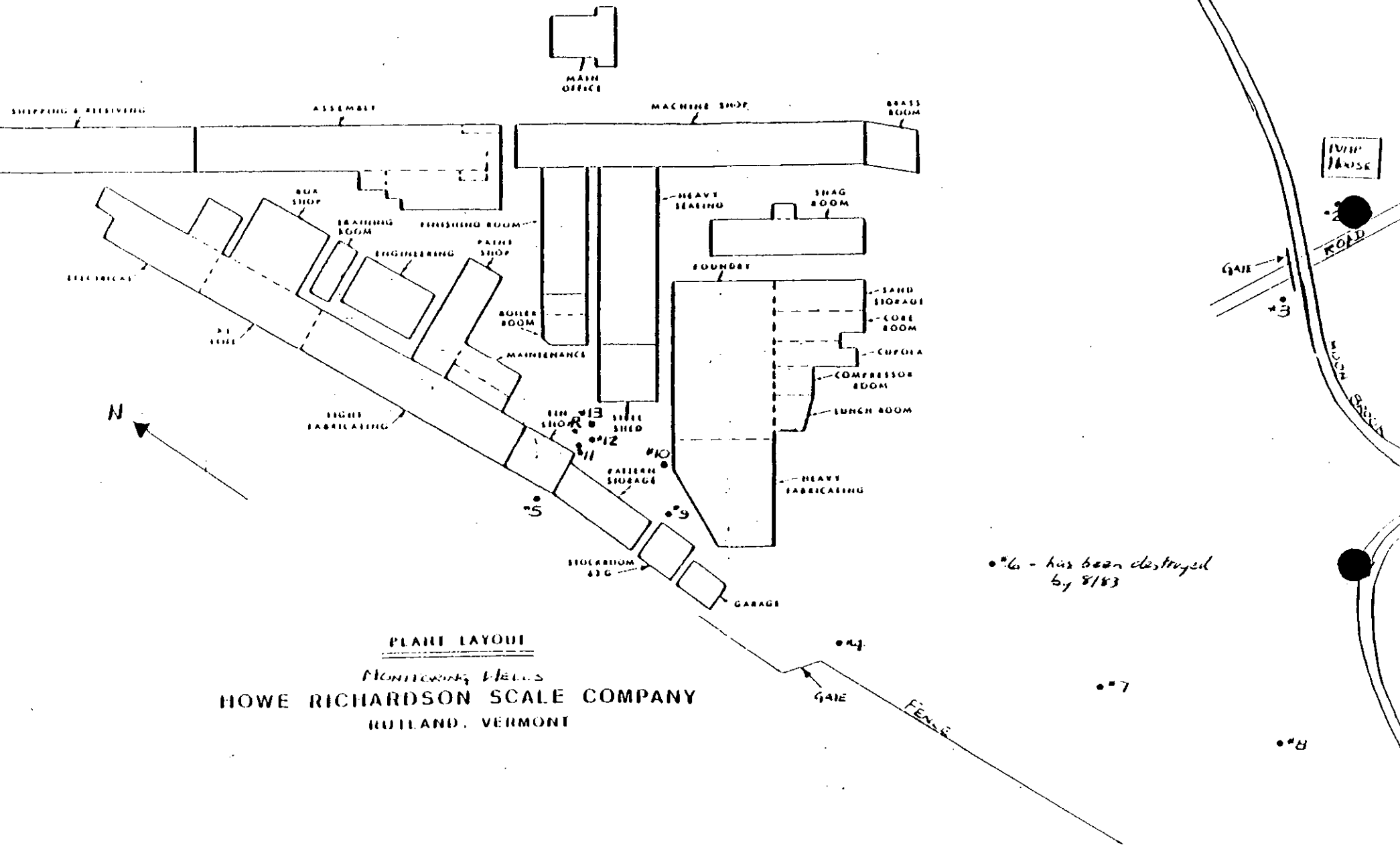


TABLE 1

Water Quality Monitoring at the
Former Howe-Richardson Scale Facility
Rutland, Vermont
September 11 & 12, 1984

Location	Static Water Levels (feet from TOC)			Depth to Bottom of Well (feet from TOC)	Sept. 11, 1984		Sept. 12, 1984	
	9/11-initial	9/11-sampling	9/12-sampling		Conductivity (umhos/cm)	pH (Su)	Conductivity (umhos/cm)	pH (Su)
TW1	10.15	10.5	12.42	19.3	600	6.85	840	7.05
TW2	11.7	11.58	11.67	20.8	455	7.0	680	7.20
TW3	15.2	15.16	15.13	18.8	445	6.8	620	7.20
TW4	14.08	19.67	17.38	29.1	1,370	7.1	1,170	7.25
TW5	4.5	--	5.58	9.45	310	7.1	---	--
TW7	17.75	20.92	20.63	30.4	580	7.45	590	7.40
TW8	19.65	23.67	23.17	30.25	1,180	7.6	1,120	7.45
Moon Brook upstream culvert	--	--	--	--	--	--	360	8.05
Moon Brook downstream culvert	--	--	--	--	--	--	350	7.5

TOC denotes top of casing.

The depth to the bottom of the well is the depth to the sediment that has collected.

TABLE 2

Water Quality Monitoring at the
Former Howe-Richardson Scale Facility
Rutland, Vermont
September 11 & 12, 1984

Sample Location	Methylene Chloride (ug/l)	1,1 - Dichloroethylene (ug/l)	1,1 - Dichloroethane (ug/l)	1,1,1- Trichloroethane (ug/l)	Chloroform (ug/l)	1,2 - Dichloroethane (ug/l)	Chlorobenzene (ug/l)
TW1-9/11	nd	nd	nd	nd	nd	nd	nd
TW2-9/11	nd	nd	nd	nd	nd	nd	nd
TW3-9/11	nd	nd	nd	nd	nd	nd	nd
TW4-9/11	6.	610.	720.	130.	15.	12.	2.
TW4-9/12	9.	770.	830.	120.	6.	11.	1.
TW5-9/12	nd	nd	nd	nd	nd	nd	nd
TW7-9/11	4.	10.	9.	88.	nd	nd	nd
TW8-9/11	nd	1.	4.	3.	nd	nd	nd
Moon Brook-9/12 downstream culvert	nd	nd	nd	nd	nd	nd	nd

The term nd signifies that the compound was not detected in the sample.

No other volatile priority pollutants were detected.

The 9/11/84 TW4 sample had gas bubbles in both duplicate vials. There were no gas bubbles in the vials when the samples were taken.

Laboratory report for:

Page 1 of 2

John Amadon
Dubois & King
Box 339
Randolph, Vt. 05060

Date reported: 09/24/84
Date received: 09/14/84
Lab ID #: 5546

Sample Identification:

Nine water samples for volatile organic assay and quantification. The samples were collected by Dubois & King personnel.

Method:

All testing of volatile organic compounds was by purge and trap gas chromatography (GC) with flame ionization detection. GC conditions were in accordance with EPA Method 624.

Results:

<u>Volatile Organic Compounds</u>	<u>Concentration</u>
<u>Sample # 344-84-1 (TW 1)</u>	
None Detected	
<u>Sample # 344-84-2 (TW 2)</u>	
None Detected	
<u>Sample # 344-84-3 (TW 3)</u>	
None Detected	
<u>Sample # 344-84-4* (TW 4, 9/11/84)</u>	
Methylene Chloride	0.006
1,1-Dichloroethylene	0.61
1,1-Dichloroethane	0.72
1,1,1-Trichloroethane	0.13
Chloroform	0.015
1,2-Dichloroethane	0.012
Chlorobenzene	0.002

* Air bubbles were present in both vials.

All results are reported in mg/l.

Authorized Signature: _____

William Brunkhorst
William Brunkhorst
Lab Director

Laboratory report for:

Page 2 of 2

John Amadon
Dubois & King
Box 339
Randolph, Vt. 05060

Date reported: 09/24/84
Date received: 09/14/84
Lab ID #: 5546

Sample Identification:

Nine water samples for volatile organic assay and quantification. The samples were collected by Dubois & King personnel.

Method:

All testing of volatile organic compounds was by purge and trap gas chromatography (GC) with flame ionization detection. GC conditions were in accordance with EPA Method 624.

Results:

<u>Volatile Organic Compounds</u>	<u>Concentration</u>
<u>Sample # 344-84-5 (TW 7)</u>	
Methylene Chloride	0.004
1,1-Dichloroethylene	0.010
1,1-Dichloroethane	0.009
1,1,1-Trichloroethane	0.088
<u>Sample # 344-84-6 (TW 8)</u>	
1,1-Dichloroethylene	0.001
1,1-Dichloroethane	0.004
1,1,1-Trichloroethane	0.003
<u>Sample # 345-84-1 (Main Brook)</u>	
None Detected	
<u>Sample # 345-84-2 (TW 5)</u>	
None Detected	
<u>Sample # 345-84-3 (TW 4, 9/12/84)</u>	
Methylene Chloride	0.009
1,1-Dichloroethylene	0.77
1,1-Dichloroethane	0.83
1,1,1-Trichloroethane	0.12
Chloroform	0.006
1,2-Dichloroethane	0.011
Chlorobenzene	0.001

All results are reported in mg/l.

Authorized Signature: _____

William Brunkhorst
William Brunkhorst
Lab Director

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site

☒ Other: groundwater monitoring well
Sample

Shipper Name: Aerojet General c/o DuBois & King, Inc.

Address: Rte 66 PO Box 339 Randolph VT 05060
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3376
signature

Date Sampled 9/11/84 Time Sampled 4:22 PM hours

Type of Process Producing Waste HR monitoring well - TWI

Field Information static water level 10.15 ft TOC, pre-purge.

The well was purged in the morning and sampled at 4:22 PM
when the well had recovered to 10.50 ft TOC

Sample Receiver:

1. Eastern Analytical, Inc. Concord N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DuBois & King Laboratory Director 9/11 - 9/13/84
signature title inclusive dates

2. Marcia L. Lorton Secretary 9/11/84
signature title inclusive dates

3. _____
signature title inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site

X Other: Groundwater monitoring well
Sample

Shipper Name: Aerjet General c/o DuBois + King, Inc.

Address: Rte 66 PO Box 339 Randolph VT 05060
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3376
signature

Date Sampled 9/11/84 Time Sampled 4:08 PM hours _____

Type of Process Producing Waste HR monitoring well - TW2

Field Information Static water level 11.7 ft TOL, prepurge:

The well was purged in the morning and sampled at 4:08 PM
when the well had recovered to 11.58 ft TOL

Sample Receiver:

1. Eastern Analytical Inc. Concord N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DuBois + King Lab Director 9/11 - 9/13/84
signature title inclusive dates

2. Marcia Burton Secretary 9/14/84
signature title inclusive dates

3. _____
signature title inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site

☒ Other: Groundwater monitoring well
Sample

Shipper Name: Aerojet General c/o DuBois + King, Inc.

Address: Rte 66 PO Box 334 Randolph VT 05080
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-7776
signature

Date Sampled 9/11/84 Time Sampled 4:32 PM hours

Type of Process Producing Waste Groundwater monitoring well - HR TW3

Field Information Static water level 15.2 ft. TOL, pre purge.

The well was purged in the late morning and sampled at 4:32 PM.
When the well had recovered to 15.16 ft TOL.

Sample Receiver:

1. Eastern Analytical, Inc. Concord N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DuBois King Lab Director 9/11-9/13/84
signature title inclusive dates

2. Marcia L. Latorre Secretary 9/14/84
signature title inclusive dates

3. _____
signature title inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site

X Other: groundwater monitoring well
Sample

Shipper Name: Aarjet General Co DeBeis + King Inc.

Address: Rte 66 PO Box 339 Randolph VT 05080
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3776
signature

Date Sampled 9/11/84 Time Sampled 5:24 PM hours _____

Type of Process Producing Waste HA monitoring well TW4

Field Information Static water level 14.08 Ft TOC, pre pump.

The well was purged in the mid afternoon and sampled at 5:24

when the well had recovered to 14.67 Ft TOC

Sample Receiver:

1. Eastern Analytical, Inc. Concord N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DeBeis + King Lab Director
signature title

9/11 - 9/13/84
inclusive dates

2. Marcia Hunter Secretary
signature title

9/12/84
inclusive dates

3. _____
signature title

_____ inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site

☒ Other: groundwater monitoring well
Sample

Shipper Name: Aerojet General Co DuBois + King, Inc.

Address: Rte 66 PO Box 339 Randolph VT 05080
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3376
signature

Date Sampled 9/11/84 Time Sampled 5:04 PM hours _____

Type of Process Producing Waste HR monitoring well TW 7

Field Information Static water level 17.75 ft TOL, one purge.

The well was purged in the early afternoon and sampled at 5:04

when the well had recovered to 20.92 ft TOL

Sample Receiver:

1. Eastern Analytical Inc. Concord N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DuBois + King Lab Director 9/11 - 9/17/84
signature title inclusive dates

2. Marcia L. Burton Secretary 9/10/84
signature title inclusive dates

3. _____
signature title inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site _____

☒ Other: Groundwater monitoring well
Sample

Shipper Name: Aerojet General C/o DuBuis + King, Inc.

Address: RT2 66 PO Box 339 Randolph VT 05080
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3776
signature

Date Sampled 9/11/84 Time Sampled 5:10 pm hours _____

Type of Process Producing Waste HR monitoring well TW8

Field Information Static water level 19.65 ft TOC, pre-purge.

The well was purged in the early afternoon and sampled at 5:10
when the well had recovered to 23.67 ft TOC.

Sample Receiver:

1. Eastern Analytical Inc. Concord N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DuBuis + King Lab Director 9/11 - 9/13/84
signature title inclusive dates

2. Marcia Burton Secretary 9/11/84
signature title inclusive dates

3. _____
signature title inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site _____

X Other: Surface stream
Sample

Shipper Name: Aerijet General c/o DuBois & King, Inc.

Address: Rt 66 PO Box 339 Randolph VT 05060
number street city state zip

Collector's Name John F. Amaden Telephone: (802) 728-3376
signature

Date: 9/12/84 Time Sampled 9:15 AM hours

Type of Process Producing Waste unincinerated surface stream

Field Information Sample taken on downstream side of the
railroad culvert at the southwest corner of the property.

The duplicate sample was taken from a quiescent pool.

Sample Receiver:

1. Eastern Analytical, Inc. Concord NH 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amaden DuBois & King, Inc. Lab Director 9/11-9/12/84
signature title inclusive dates

2. Maria Burton Secretary 9/14/84
signature title inclusive dates

3. _____
signature title inclusive dates

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site _____

☒ Other: groundwater monitoring well
Sample

Shipper Name: Aerjet General C/O DuBois & King, Inc.

Address: Rte 66 PO Box 339 Randolph VT 05060
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3376
signature

Date Sampled 9/12/84 Time Sampled 11:29 AM hours _____

Type of Process Producing Waste HR monitoring well TW5

Field Information 9/11/84 static level 450 ft TOC prepurge.

The well was purged on 9/11/84 and, due to slow recovery, sampled
(single vial) 11:29 AM on 9/12/84 when the static level was 5.58' TOC.

Sample Receiver:

1. Eastern Analytical, Inc. Concord, N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador DuBois & King, Lab Director 9/11 - 9/13/84
signature title inclusive dates

2. Marcia L. Amador Secretary 9/14/84
signature title inclusive dates

3. _____
signature title inclusive dates

Collector's Sample No. 345-84-3
(HR TW 4 9/12/84)

CHAIN OF CUSTODY RECORD

Location of Sampling: _____ Producer _____ Hauler _____ Disposal Site _____

☒ Other: groundwater monitoring well
Sample

Shipper Name: Aerjet General Co Dubois & King, Inc.

Address: Rte 66 PO Box 339 Randolph VT 05060
number street city state zip

Collector's Name John F. Amador Telephone: (802) 728-3376
signature

Date Sampled 9/12/84 Time Sampled 12:59 PM hours _____

Type of _____ monitoring well TW 4

Field Information Following purging & sampling on 9/11/84, the well
was purged at 9:25 AM on 9/12/84 from the static level of 14.08 ft TDC
Sampling was redone at 12:59 PM on 9/12/84 when static level was 17.38 ft TDC

Sample Receiver:

1. Eastern Analytical, Inc. Concord, N.H. 03301
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. John F. Amador Dubois & King Lab Director 9/11 - 9/13/84
signature title inclusive dates

2. Marcia Bruton Secretary 9/14/84
signature title inclusive dates

3. _____
signature title inclusive dates